A1250-1

APRIL 8, 1985

CHEMICAL & ENGINEERING

NEWS

0511 179C095 9 W AR6314SL 1
CONGRESSIONAL INFO SERV-SRI
4520 EAST WEST HWY SUITE 800
SRI ACQUISITIONS
BETHESDA MD 20814

CHEMICAL & ENGINEERING
NEWS

Volume 63, Number 14
CENEAR 63 (14) 1–48
ISSN 0009-2347

APRIL 8, 1985

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News Focus

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CHEMICAL R&D: Outlook fair for federal funding

The outlook for federal support of basic research in chemistry in fiscal 1986—particularly research conducted at academic institutions—is favorable, considering current budget pressures. However, support for applied research in chemistry varies across the mission agencies, showing a mix of increases, level funding, and decreases.

Those are the conclusions contained in an American Association for the Advancement of Science analysis of the proposed federal research budget for fiscal 1986, released last week at a colloquium in Washington, D.C. The analysis of the chemical R&D budget was prepared by Annette T. Rosenblum and Mary Wolfe of the American Chemical Society's Department of Government Relations & Science Policy.

At the National Science Foundation, the report notes that funding for the chemistry division is proposed to rise 7% to $93.5 million in fiscal 1986. The agency's goal is to support the same number of scientists, 875, but to increase the average grant size from $86,965 to $91,667. Funding for chemical instrumentation is set at $11.5 million, with $2 million earmarked for maintaining the nine regional instrumentation facilities. Foundation-wide support for chemistry is set to increase 6% to almost $208 million.

Department of Defense support for basic chemical research is up 11% to $74.7 million in the proposed budget. About $40.9 million is designated for chemical research under the auspices of the Army, Navy, and Air Force contract offices. Universities and colleges, the analysis says, will receive about 86% of that chemistry money. But it warns that these numbers may be "soft"—they are estimates that have been revised often in the past.

Overall support for chemistry programs by the Department of Energy is expected to rise 3% to $245 million, even though funding for the chemical sciences program would be frozen at the fiscal 1985 level of $79.5 million. Of the $20 million slated for chemical research under the fossil energy program, the analysis says that 10% appears destined for academic institutions, with most of that funding coming from the advanced research and technology development subprogram.

In DOE's biological and environmental research program budget proposal, funding for acid rain research remains unchanged at $6.5 million. Research to develop advanced radiation and analytical instrumentation continues at $5.9 million, and the $2.1 million earmarked for research in chemical physics will be used to investigate molecular relaxation phenomena. About 70% of the unchanged budget for energy storage, or $13 million, is targeted for chemistry research. Of that amount, about $4.3 million will go directly to universities.

At the Environmental Protection Agency, the report notes that much of the proposed 9% rise to $230 million in research involving chemistry is the result of a 61% increase to $60.5 million in acid rain research funding. Of the extramural research programs involving chemistry, hazardous waste is slated for a 36% increase to $33 million and pesticides research a 74% increase to $43.3 million.

Funding for the Department of Agriculture's eight major research centers is expected to be up less than 1% to $157 million, the analysis says, with the chemical research effort appearing to decrease from the 1985 level. The opposite is true at the National Bureau of Standards, where the overall proposed budget is down, but the programs that traditionally fund chemistry are up 40% to $10 million.

The budget proposal for the National Institutes of Health was not overlooked in the analysis of chemical research funding. However, it is the hardest one to pin down, because programs supporting chemistry are not budgeted separately at NIH. Thus, total yearly support for chemistry can be determined only in retrospect. However, it is assumed that support for chemistry moves in proportion to the overall budget—thus chemistry also should expect a 2% increase in funding.

Copies of "AAAS Report X: Research & Development, FY 1986" can be obtained from the AAAS Sales Office, 1515 Massachusetts Ave., N.W., Washington, D.C. 20005. □

Direct federal support for chemical research is up 8% . . .

$ Millions	1986[a]	1985[a]	1984[b]	% change 1985–86
NSF	$147.4	$137.8	$127.7	7%
Energy	102.1	101.1	96.6	0
Defense[c]	74.7	67.0	61.7	11
NBS	10.0	7.2	6.5	39
TOTAL	$334.2	$313.3	$292.5	8%

. . . and programs that include some chemistry funds are up 5%

$ Millions	1986[a]	1985[a]	1984[b]	% change 1985–86
EPA	$220.9	$210.8	$169.0	9%
Energy	166.0	150.4	147.9	4
Defense[c]	72.6	64.9	65.0	12
NSF	60.4	57.2	52.5	6
NBS	35.6	42.3	38.5	−16
TOTAL	$554.5	$525.4	$472.9	5%

a Estimate. b Actual. c Funds are those classified under budget category 6.1, designated for basic research. Note: NIH funding for chemical research not included because it is not budgeted separately. Source: American Chemical Society

Lead Cut Gives Alcohols Crack at Gasoline Blend Market

EPA's sharp phasedown in lead consumption in gasoline paves way for methanol and ethanol use to supply needed octane requirements

Two recent actions by the Environmental Protection Agency have given alcohol fuels—methanol and ethanol, primarily—a golden opportunity to crash into the alcohol-gasoline blend market in a big way.

Last month, EPA issued its final rule on lead phasedown (C&EN, March 11, page 8). Under it, the maximum allowable lead content of leaded gasoline will drop from the current 1.1 g per gal to 0.1 g per gal by Jan. 1, 1986, with an interim standard of 0.5 g per gal effective July 1. That's a 91% reduction in allowable lead content.

Something else, obviously, will have to be used to supply the octane that can no longer be obtained with lead additives. Alcohol producers are hoping that their product will be one of the alternatives.

Earlier this year, EPA also granted Du Pont a waiver from the Clean Air Act for a new blend of methanol, other alcohols, and unleaded gasoline. Because one of the "other alcohols" could be ethanol, the Du Pont waiver was heralded as the springboard into the fuel market for both methanol and ethanol.

Recently, representatives of the alcohol fuels industry met in San Antonio to discuss what these two EPA developments mean for their products. Attendance at this fourth annual meeting sponsored by Alcohol Week was the largest and, arguably, the most enthusiastic ever. But delegates were left like the long-lost nephew who just discovered that he was in his aunt's will. They know that they will get something. They just don't know how much.

Initial euphoria over the Du Pont waiver has been tempered by the restrictions that EPA placed on it. EPA granted the six requirements requested by Du Pont. But it also imposed two restrictions of its own, one of which threatens to limit severely the waiver's market impact.

In accordance with Du Pont's request, maximum methanol content is limited to 6% (by volume) with minimum cosolvent volume of 2.5%. Cosolvents are limited to ethanol, propanols, butanols, or any mixture of them.

The controversy concerns EPA's added requirement that the finished fuel meet certain volatility specifications as measured by its Evaporative Index (EI) in addition to the normal Reid Vapor Pressure (RVP) requirements. Almost everyone in the industry agrees that this restriction is so severe that very few refiners or blenders will be able to produce a finished fuel blend that can meet the specifications. As a result, the Du Pont waiver may not become the dynamic marketing tool that many thought it would be.

Ironically, the EI concept of measuring volatility was developed at Du Pont. But Edward N. Cantwell, now a consultant but who developed EI when he was at Du Pont, says that EI shouldn't be used for control purposes.

As a result of the EI restriction, Cantwell believes that the Du Pont waiver is limited to no more than 10 to 15% of the gasoline market. "We didn't get a lot when we got that waiver," he says. Cantwell adds that the market potential under the Du Pont waiver could be multiplied if the EI regulations were less restrictive. That could happen. The Oxygenated Fuel Association (OFA) has petitioned EPA to reconsider the terms of its Du Pont waiver, particularly the EI restrictions.

Robert E. Reynolds, marketing manager for New Energy Co. of Indiana, agrees that the EI require-

Lead phasedown could mean huge market for alcohol fuels

	Gasoline demand (billions of gal)		Lead consumption (billions of grams)		Reduction in lead (billions of grams)	Alcohol equivalent[b] (billions of gal)
	Total	Unleaded[a]	Old rules	New rules[a]		
1985	100.6	32.2	44.3	25.8	18.5	3.70
1986	100.3	28.8	41.3	2.9	38.4	7.68
1987	100.0	25.6	38.4	2.6	35.8	7.16
1988	99.6	22.4	35.6	2.2	33.4	6.68
1989	99.3	19.2	32.8	1.9	30.9	6.18
1990	99.0	16.4	30.4	1.6	28.8	5.76
1991	99.0	14.9	27.8	1.5	26.3	5.26
1992	99.0	13.4	27.2	1.3	25.9	5.18
1993	99.0	12.4	26.4	1.2	25.2	5.04
1994	99.0	11.5	25.7	1.1	24.6	4.92
TOTAL	994.8	196.8	329.9	42.1	287.8	57.56

a Assumes no illegal fuel switching (leaded for unleaded). b Assumes that 1 gal of alcohol is equivalent to about 5.0 g of lead in terms of the level of octane boost achieved. Source: Herman & Associates based on Environmental Protection Agency data

ments limit the usefulness of the Du Pont waiver. But he does see some positive signs. First, he says, it signals that it is possible to obtain additional waivers for oxygenated fuels. And he calls the Du Pont waiver the closest thing the industry has seen to a generic waiver. That's because it allows various combinations of cosolvents to be used, alone or in combination.

Like its Du Pont waiver, EPA's new lead phasedown rules probably will give a boost to market demand for the fuel alcohols ethanol and methanol. But as with the Du Pont waiver, nobody seems able—or willing—to put precise figures on the market potential.

Theoretically, at least, the market potential for alcohols, as a result of lead phasedown, is tremendous. Marilyn J. Herman, president of Herman & Associates, Washington, D.C., gave some indication at the San Antonio meeting. Working with EPA data, Herman says that the new lead rules will reduce lead use in gasoline between the second half of 1985 and 1995 an additional 288 million g more than it would have dropped had the old regulations prevailed.

If refiners replaced all of that lead with alcohols alone to obtain the required octane, they would need 57.6 billion gal of alcohol, says Herman. Of course, refiners have no intention of using only alcohols to make up their octane deficit.

Many refiners will make capital investments in octane-producing processing units. Reforming will be a priority, followed possibly by isomerization and alkylate production. Some refiners will look to the aromatics—benzene, toluene, and xylene—and others will turn to methyl *tert*-butyl ether (MTBE). Alcohols will have plenty of competition for the octane market.

In addition to this competition, alcohols still face tremendous marketing problems in penetrating the octane market. But the EPA lead phasedown regulations and the Du Pont waiver give them their best shot at cracking the market in large volumes. The problem is that nobody really knows with certainty what those volumes will be.

Earl Anderson, New York

Chemical capital spending shows strong gains

Chemical capital spending took a sharp upturn in the fourth quarter of 1984 and for the full year, according to the Conference Board. And capital appropriations (monies that companies plan to spend in the future) also rose sharply, indicating that capital expenditures may well continue to increase in the next few years.

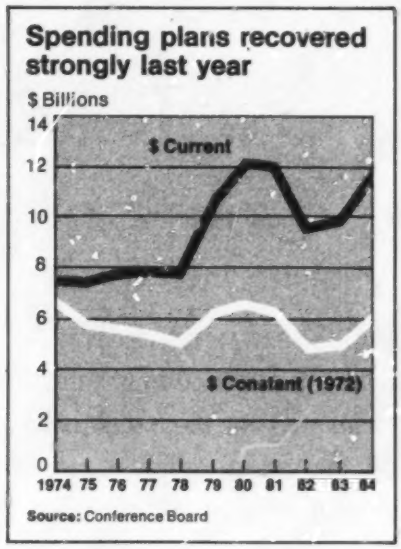
But neither measure achieved the vitality shown in the early 1980s. Chemical plant capacity utilization is still hovering in the low 70% range, according to government data, obviating the need for new chemical plants and limiting capital spending largely to the modernization of existing facilities.

According to the Conference Board, a New York City-based business research group, capital spending for chemicals and allied products in the fourth quarter totaled a seasonally adjusted $3.03 billion, up 15% from the previous three months. This is the largest quarter-to-quarter increase since the first three months of 1974.

At the same time, capital appropriations shot up 18% to $3.33 billion from the third quarter, thus ending the year on a strong note. And the appropriations in the fourth quarter are the greatest since the third quarter of 1981, when companies appropriated $3.39 billion.

On a constant-dollar (1972) basis, capital appropriations in the fourth quarter climbed 20% from the third quarter to $1.70 billion, a better performance than in current dollars, indicating some disinflation. Similarly reflecting disinflation, constant-dollar capital expenditures rose 17% to $1.55 billion, compared with the 15% rise in current dollars.

Year-to-year, chemical capital appropriations in the fourth quarter were 25% higher than in the similar period a year earlier. That follows a 4% drop in the third quarter. In constant dollars, fourth-quarter planned spending was up 26% from the 1983 period, following a 5% drop in the third quarter of last year.



Actual capital spending in current dollars was up 30% in the fourth quarter, compared to fourth-quarter 1983, following an 11% year-to-year increase in the third quarter. Constant-dollar spending in the fourth quarter was up 32% from a year earlier, following a 10% annual rise in the third quarter.

For the full year 1984, capital spending totaled $11.2 billion, up 20% from 1983. Although that's a substantial increase, spending still remains below its historic high of $11.7 million in 1981. In constant 1972 dollars, capital spending last year totaled $5.72 billion, up 20% from the year before, but 7% below the historic high in 1981.

Meanwhile, capital appropriations last year were $11.9 billion, also an increase of 20% over the year before, but only 2% below the historic high of 1980. Constant-dollar appropriations, too, rose 20% last year to $6.13 billion, but that is still almost 9% below its historic high in 1980. In spite of the strong recovery in 1984, real-dollar appropriations are still nearly 9% less than levels of a decade ago.

With the large increases, it may be that the chemical industry is finally joining the rest of industry, where capital spending has been rising fairly strongly for the past couple of years, a situation that the Conference Board says will continue through 1985. □